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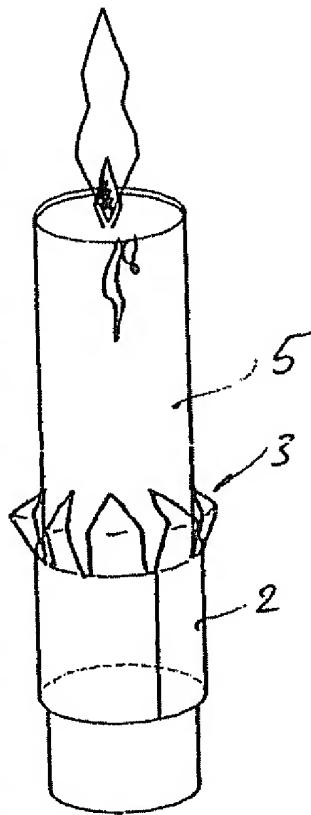
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: EXTINGUISHER DESIGNED FOR USE ON A CANDLE

(57) Abstract: The invention is an extinguisher designed for use on a candle of the type mounted in a candlestick or similar holder. The purpose of the extinguisher is to extinguish the flame when the candle has burnt down to a certain height. The invented extinguisher consists of a resilient, slotted metal bush which at one end is provided with a number of elastic tongues. The tongues are in the initial shape of the bush stamped so that the spring action makes them bend radially inward towards the centre of the bush, causing the tongues to close almost tightly into a cone shape at the end of the bush. The bush is in shape and size designed to be placed on the outside of a candle (paraffin wax candle or similar type of combustible candle) at the height on the candle where it should be extinguished. During mounting on the candle the tongues will bend elastically outwards making room for the candle inside the bush which will then enclose the candle tightly. When the candle has burnt down to the level of the tongues they will bend inward towards the centre as a result of their stamping and spring action (initial shape). In the closed position the tongues will close tightly above and around the flame thus smothering the fire.



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Extinguisher designed for use on a candle

The present invention is an extinguisher designed for use on a candle and of a type defined by the introduction to requirement 1.

It is a well-known fact that candles (paraffin wax candles or the like burning with an open flame) are the cause of many fires. Especially at Christmas-time when candles are used extensively together with easily combustible Christmas decorations there is a considerable fire hazard. This fire hazard could to some extent be reduced if the candles were self-extinguishing, i.e. if the individual candle would extinguish automatically when it had burnt down to a certain position. The position should of course be chosen so that the flame in no circumstances will be able to get close to surrounding combustible material such as spruce branches or the like while the candle burns down. This means that in some cases the chosen extinguishing position should be relatively high on the candle, and in other cases the extinguishing position can be further down on the candle close to the aperture in the candlestick without representing any fire hazard.

A self-extinguishing candle has already been designed where the wick is provided with an embedded blocking device preventing the flame from continuing down along the wick once the candle has burnt down to the device. As the user is not able to determine whether the extinguishing position is at a sufficiently high point on the candle in relation to surrounding combustible material, the use of the said type of candle still involves a certain element of risk. The user is unable to change the extinguishing position (blocking device) of a given candle, and it is not possible by looking at the candle to easily determine 1) whether it is provided with a blocking device and 2) where any blocking device is located in the candle. In practice, therefore, the already known type of extinguisher involves considerable uncertainty.

The invention is based on the task of designing an extinguisher which does not embody the shortcomings and drawbacks connected with the above-mentioned known type of extinguisher with embedded wick blocking device. The precise purpose is to design a simple, easy-to-use and reliable extinguisher which the user can position on the candle at an optional height and which by means of its extinguishing function ensures completely risk-free extinguishing of the candle once it has burnt down to the position of the extinguisher.

According to the invention the problem is solved by designing an extinguisher consisting of a resilient, slotted metal bush which at one end is provided with a number of elastic tongues.

The tongues are in the initial shape of the bush stamped so that the spring action will cause them to bend radially inward towards the centre of the bush, causing the tongues to close almost tightly at that end of the bush. The bush is in shape and size designed to be placed on the outside of a candle (paraffin wax candle or similar type of combustible candle) at the height on the candle where it should be extinguished. During mounting on the candle the tongues will bend elastically outward so that the bush will enclose the candle. When the candle has burnt down to the level of the tongues they will bend inward towards the centre as a result of their elastic stamping (initial shape of tongues). In the closed position the tongues will close tightly above and around the flame thus smothering the fire.

In a preferred extinguisher design according to the invention the bush has in its initial shape

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been bent or rolled into a diameter less than the diameter of the smallest candle on which the extinguisher is to be placed. This makes the extinguisher self-retaining on the candle over a relatively large diameter interval as a result of the extinguisher's resilient clamping action around the candle. The extinguisher can be placed at any desired height on the candle.

5 The extinguisher is suitably made of thin sheet steel, chiefly deformation-hardened (hard-rolled) carbon steel of a thickness ranging from 0.1-0.3 mm depending on the diameter of the bush. The material may be punched into the desired shape and subsequently shaped by stamping, rolling, press forming or another suitable forming operation. The material is
10 inexpensive and the extinguisher can therefore be made at a relatively low cost, for example for single use.

15 If made as specified in requirements 4 and 5 the tongues will have a well-defined closing position in an unloaded condition. In the closed position it is important that the tongues close reasonably tightly so that the flame is smothered effectively.

20 Requirement 6 states a design where the bush is provided with a radial inward-facing ring-shaped bulb placed in the area between the downward-facing edge of the bush and the upward-facing edge which is slotted into tongues. The bulb contributes to giving the extinguisher a firm grip on the candle, ensuring that the extinguisher is held at the desired height on the candle, even if it is tapered.

25 The spring effect of the tongues can according to the invention be increased by making the bush of the well-known type of bimetal which changes shape when heated. The bimetal should be positioned so that the tongues will curve inward towards the centre of the bush when the metal is heated by the flame. This will increase the closing force of the tongues and consequently also the reliability of the extinguisher.

30 The invention is explained in detail below in connection with the drawing where

35 Fig. 1 shows a side view of an extinguisher in its initial position,
 Fig. 2 shows the same mounted on a candle,
 Fig. 3 shows the unfolded extinguisher, i.e. before being rolled into a bush but after stamping of the tongues,
 Fig. 4 is a sectional view of the same along the line A-A in Fig. 3,
 Fig. 5 shows a side view of a different design of the extinguisher,
 Fig. 6 is a vertical sectional view of the same along the centre axis of the bush, and
 Fig. 7 is a sectional view along the line B-B in Fig. 5.

40 In the design shown in Fig. 1-4 of the drawing the extinguisher consists essentially of a slotted, resilient bush, 2, made of thin metal foil or sheeting, for example 0.2 mm resilient sheet steel. At one end the bush is slotted into a number of tongues, 3. The tongues are shaped like pointed teeth and have by pre-bending or stamping of the material been bent into an angle as shown in Fig. 4. When the sheet is subsequently rolled or bent into the shape of a bush (Fig. 1), the tongues, 3, will together form a closed taper or cone, 4.

45 Owing to the elasticity and resilience of the material the tongues, 3, are able to deflect radially outward when the bush, 2, is placed on a candle, 5. This allows the extinguisher to be

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placed in any desired position on the candle, meaning that optimum protection against ignition of surrounding material can be provided in all circumstances. When the candle has burnt down to the level of the tongues, 3, their own spring action will cause them to move back towards the initial shape, i.e. close to form the mentioned closed conical shape (see Fig. 1 and 5). In that way the flame will be smothered and the candle will be extinguished effectively.

The tongues, 3, are suitably provided with stamped bending zones, 3a, where the elastic deflection chiefly takes place. The bending zones, 3a, are line-shaped sections of material where the material thickness has been suitably reduced by stamping. The reduced material thickness will increase the elastic flexibility of the material along these lines so that the deflection of the tongues chiefly will take place along the bending zones, see Fig. 2. The bending zones thus ensure precise and well-defined rebending of the tongues when they close.

Fig. 5-7 show an extinguisher design where the bush is provided with an internal bulb, 6. The bulb contributes to holding the extinguisher in place on the candle when it is tapered. Fig. 7 shows how the bush, 2, has been rolled into a specific initial diameter where the ends, 7, of the metal strip overlap. In that way the bush obtains the mentioned self-retaining property through spring action when the extinguisher has been positioned on the candle.

The invention is not limited to the design shown in the drawing and described above. Other combinations of materials, other detail designs and other constructive solutions regarding the individual components of the extinguisher are conceivable within the framework of this invention, and the use of the extinguisher may be extended to areas other than those described above.

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PATENT REQUIREMENTS

1. Extinguisher (1) for use on a candle (5), where the candle is placed in a candlestick or similar holder and where the purpose of the extinguisher is to extinguish the candle once it has burnt down to a specific height, *characterised by* comprising a resilient, slotted metal

5 bush (2) which at one end is provided with a number of radially inward-facing resilient tongues (3) which by their spring action, in the initial shape of the bush, close almost tightly at that end of the bush, and where the bush (2) in shape and size is designed to be placed on the outside of a candle (paraffin wax candle or similar type of combustible candle (5)) at the height on the candle where it should be extinguished, and where the mentioned tongues (3)

10 bend radially outward by elastic deflection.

2. Extinguisher according to requirement 1, *characterised by* the fact that the bush (2) in its initial shape has a diameter less than the diameter of the smallest candle on which the extinguisher (1) is to be placed, making the extinguisher self-retaining on the candle over a relatively large diameter interval - a property being a result of the extinguisher's resilient

15 clamping action radially around the candle.

3. Extinguisher according to requirement 1, *characterised by* the bush being made of thin sheet steel, chiefly deformation-hardened (hard-rolled) carbon steel of a thickness ranging from 0.1-0.3 mm depending on the diameter of the bush.

20 4. Extinguisher according to requirement 1, *characterised by* the fact that the radially inward-facing resilient tongues (3) at their free ends are pointed so that the tongues in their closed position together form a cone or cone-like shape which is closed at the top (4).

25 5. Extinguisher according to requirement 3 or 4, *characterised by* the fact that each of the tongues (3) has been pre-bent or stamped in one or more line-shaped bending zones (3a) which partly provide the tongues with the said radially inward deflected closing position in neutral initial position and partly provide the tongues with a suitable spring effect allowing the tongues to deflect outward when the extinguisher is placed on the candle (5).

30 6. Extinguisher according to requirement 1, *characterised by* the fact that the bush (3) is provided with a radially inward-facing ring-shaped bulb (6) placed in the area between the downward-facing edge of the bush and the upward-facing edge which is slotted into tongues.

35 7. Extinguisher according to requirement 1, *characterised by* the fact that the bush is made by rolling a strip of metal foil into a diameter less than the smallest candle diameter on which the extinguisher is to be used so that the elastic properties of the material are used to obtain resilient adjustment to various candle diameters within a relatively wide diameter interval

40 and so that the resilience makes the extinguisher self-retaining in the chosen position on the candle.

45 8. Extinguisher according to requirement 1, *characterised by* the fact that the bush is made of the well-known type of bimetal which changes shape when heated and that the bimetal is positioned in such a way in the bush/tongues that the tongues will increase their inward curve towards the centre of the bush when the material is heated by the flame.

SUMMARY**Extinguisher designed for use on a candle**

The invention is an extinguisher designed for use on a candle of the type mounted in a candlestick or similar holder. The purpose of the extinguisher is to extinguish the flame when the candle has burnt down to a certain height.

The invented extinguisher consists of a resilient, slotted metal bush which at one end is provided with a number of elastic tongues. The tongues are in the initial shape of the bush stamped so that the spring action makes them bend radially inward towards the centre of the bush, causing the tongues to close almost tightly into a cone shape at that end of the bush. The bush is in shape and size designed to be placed on the outside of a candle (paraffin wax candle or similar type of combustible candle) at the height on the candle where it should be extinguished. During mounting on the candle the tongues will bend elastically outward making room for the candle inside the bush which will then enclose the candle tightly. When the candle has burnt down to the level of the tongues they will bend inward towards the centre as a result of their stamping and spring action (initial shape). In the closed position the tongues will close tightly above and around the flame thus smothering the fire.

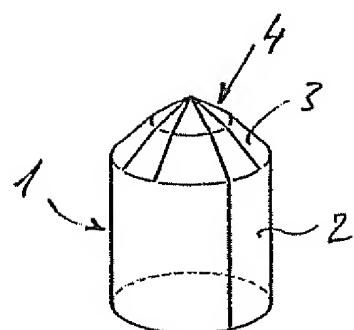


Fig. 1

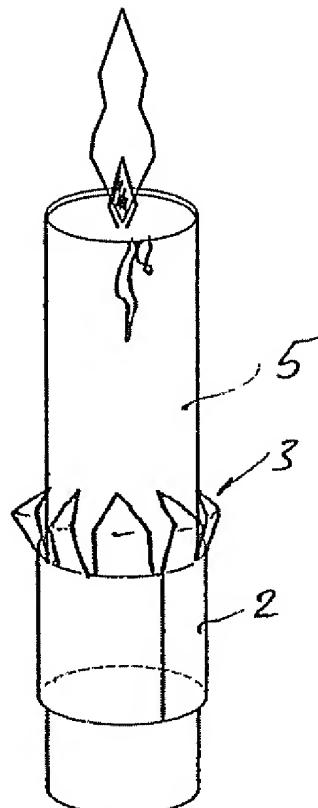


Fig. 2

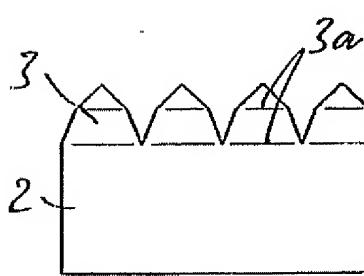


Fig. 3

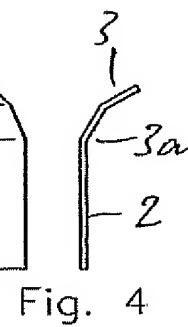
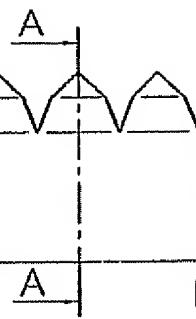


Fig. 4

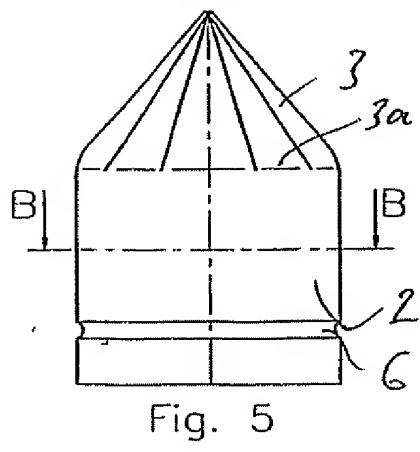


Fig. 5

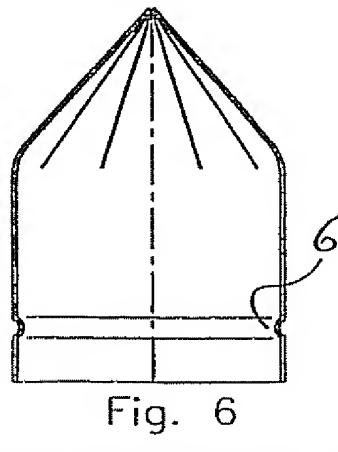


Fig. 6

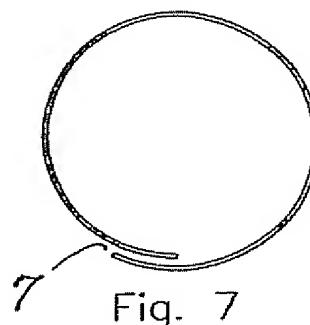


Fig. 7

SUBSTITUTE SHEET (RULE 26)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 03/00479

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F23Q 25/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: F23Q, F21V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 177488 C (JOHANN KAISERREINER), 22 November 1906 (22.11.06), figures 1-4	1-7
Y	--	8
A	DE 162175 C (HERCULAN TARTSCH), 29 July 1905 (29.07.05), figures 3-6	1-8
A	US 4818214 A (STURE RONNBACK), 4 April 1989 (04.04.89), figure 1, abstract	1-8
P,Y	WO 02057688 A1 (MAALOE, TROELS), 25 July 2002 (25.07.02), abstract	8
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 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 03/00479

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE	177488	C	22/11/06	NONE
DE	162175	C	29/07/05	NONE
US	4818214	A	04/04/89	AT 88804 T 15/05/93 AU 599419 B 19/07/90 AU 7870387 A 24/03/88 DE 3785665 A,T 03/06/93 DK 164331 B,C 09/06/92 DK 202288 A 21/04/88 EP 0279833 A,B 31/08/88 FI 881758 A 14/04/88 JP 1500686 T 09/03/89 JP 3078534 B 16/12/91 NO 164373 B,C 18/06/90 NO 881706 A 20/04/88 SE 454296 B,C 18/04/88 SE 8603568 A 26/02/88 WO 8801714 A 10/03/88
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